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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,407	01/06/2005	Hiroyuki Kawamura	SUD-0001	5487

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EXAMINER	
DAY, MAX P	

ART UNIT	PAPER NUMBER
2609	

MAIL DATE	DELIVERY MODE
06/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,407	KAWAMURA ET AL.	
	Examiner	Art Unit	
	Max P. Day	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 06 JAN 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 06 January 2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Foreign Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schofield, US 2002/0167589 in view of Mendenhall, US Patent 6133960, and further in view of Nakamura, US Patent 6914630.

Regarding Claim 1, Schofield discloses a rearview vision system with infrared illumination (Figure 19:162 and Paragraph [0089]), which reads on "infrared light irradiating means for irradiating an infrared light"; image capture device (Figure 19:14), which reads on "an imaging means for imaging the position irradiated by the infrared light irradiating means and converting to an electrical signal". Schofield describes (Paragraph [0095] and Figure 25) an extended dynamic range circuit of the rearview vision system for low-light operation where image frames are captured at different exposure intervals, which reads on "an image processor for changing the signal storage

time duration of the imaging means at a predetermined period and sequentially and periodically outputting images with a different light exposure".

While Schofield describes (Paragraph [0095]) low-light imaging with extended dynamic range that merges image frames from two different exposure intervals to form a combined image, extending images and averaging the resulting images within this process are not disclosed. The following paragraphs describe how the teachings of Mendenhall and Nakamura are combined with the invention of Schofield to extend the dynamic range of the imaging system and improve image quality for images taken at two different time intervals (Mendenhall) and two different exposure settings (Nakamura).

Mendenhall discloses in the Summary of his invention (Column 3, lines 8-29), a process of combining image frames and enlarging images by adding lines of pixels where the added pixel values are determined from weighted averages from the input pixel field. The odd field, even field image capture and extension reads on "the image processor extends images with different light exposure in the longitudinal direction". Mendenhall (Last 2 paragraphs of Column 2 and top of Column 3) further discloses this video processing system applies to image fields captured at different time intervals and produces higher quality composite images. This relates specifically to the images captured at two different light exposures in the claim, where the imaging device captures the two images of different light exposure at two different time intervals and sequentially sends them to the image processor. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include in the apparatus of

Schofield the image extension method taught by Mendenhall for the purpose of improving the quality of the composite image.

Schofield in combination with Mendenhall meets all the limitations of claim 1 except describing how the images taken at two different exposures are averaged to form a composite image. However, Nakamura discloses an imaging system (Abstract on cover page) that combines images taken at two different exposure times and forms a composite image based on the average luminance values of the first and second image signals. This reads on "averages the signal level of both images". Nakamura describes (Column 1, Lines 15-20) that averaging images taken at two exposure times extends the dynamic range of the camera and permits capturing images at widely different luminance values. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include in the apparatus of Schofield in combination with Mendenhall the image averaging process of Nakamura to form a composite image from images taken at two different exposure settings, the modified structure reading on "averages the signal level of both images after extending so that a composite image is formed".

Regarding Claim 2, Mendenhall discloses (Column 3, lines 23-29) enlarging an input image with twice as many lines of pixels as the initial image. The pixels inserted into the enlarged image are preferably determined by a weighted average of other pixels in the input field. Mendenhall further discloses (Column 9, lines 5-8) that the luminance and chrominance for each inserted pixel is determined from a weighted average using formulas based on other pixels in the vertical proximity of the inserted pixel. This reads

on "the image processor performs the extension of the images by inserting an average value of the signal level of adjacent pixels in the longitudinal direction into therebetween".

Regarding Claim 3, Schofield discloses (Paragraph [0095]) that the rearview vision system may additionally include exposure control to determine the exposure period for capturing each image frame in order to extend the dynamic range of system. The exposure control may produce exposure intervals, which vary in length from interval-to-interval, so that a series of normal exposure intervals may be occasionally supplanted by a longer exposure interval during which greater detail of the image may be captured. The enhanced image may then be combined with the image captured during the shorter intervals into a merged image of enhanced detail. This reads on "the image processor previously sets a desired value of the light exposure and controls the signal storage time duration according to the desired value".

Regarding Claim 4, Nakamura discloses exposure control (Figures 2,11,13 and 14) for the image sensing device. The exposure control (Column1, Lines 20-34) determines the CCD charge accumulation (also referred to as electronic shutter). The exposure control begins at an initial preset value (Figures 13,14) and compares input values from the image data stream to adjust the exposure settings on the CCD to an optimum value. This reads on "the imaging processor accumulates electrical signals of the imaging means and compares the accumulated electrical signals with a preset reference value according to the desired value to control the signal storage time duration". Nakamura explains (Column 3, lines 65-67 and Column 4, lines 1-4) that optimizing the exposure

control automatically based on data from the image extends the dynamic range of the camera and allows capturing images with dark and light portions as well as images containing moving objects. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to also include in the apparatus of Schofield combined with Mendenhall and Nakamura for image averaging, the exposure control as taught by Nakamura for the purpose of controlling the image exposure and extending the dynamic range of the imaging system.

Regarding Claim 5, Nakamura discloses exposure control (Figures 2,11,13 and 14) for the image sensing device. The exposure control (Column1, Lines 20-34) determines the CCD charge accumulation (also referred to as electronic shutter). Nakamura divides the input image screen into regions (Figure 7) and calculates (Figure 11) high and low speed shutter controls based on the pixel values in these regions. The exposure control begins at an initial preset value (Figures 13,14) and compares input values from the image regions to adjust the exposure settings on the CCD to an optimum value. This process reads on "the image processor compares the number of pixels having the electrical signal more than the reference value in the imaging means with the number of preset reference pixels according to the desired value to control the signal storage time duration". Nakamura explains (Column 3, lines 65-67 and Column 4, lines 1-4) that optimizing the exposure control automatically based on data from the image extends the dynamic range of the camera and allows capturing images with dark and light portions as well as images containing moving objects. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to also

include in the apparatus of Schofield combined with Mendenhall and Nakamura for image averaging, the exposure control as taught by Nakamura for the purpose of controlling the image exposure and extending the dynamic range of the imaging system.

Regarding Claim 6, Schofield (Figure 19) shows an infrared illuminating device (162) mounted on an automotive vehicle that illuminates an area outside the vehicle, an image pickup device (14) to pick up images outside the vehicle, and an image processor within the vehicle (Figure 14), which reads on "the infrared light irradiating means, the imaging means and the image processing units are provided in an automobile; the infrared light irradiating means radiates the infrared light outside the automobile and the imaging means images the outside of the automobile".

Regarding Claim 7, Schofield (Figure 19) shows an infrared illuminating device (162) mounted on an automotive vehicle that illuminates an area outside the vehicle, an image pickup device (14) to pick up images outside the vehicle, and an image processor within the vehicle (Figure 14), which reads on "the infrared light irradiating means, the imaging means and the image processing units are provided in an automobile; the infrared light irradiating means radiates the infrared light outside the automobile and the imaging means images the outside of the automobile".

Regarding Claim 8, Schofield (Figure 19) shows an infrared illuminating device (162) mounted on an automotive vehicle that illuminates an area outside the vehicle, an image pickup device (14) to pick up images outside the vehicle, and an image processor within the vehicle (Figure 14), which reads on "the infrared light irradiating means, the imaging means and the image processing units are provided in an

automobile; the infrared light irradiating means radiates the infrared light outside the automobile and the imaging means images the outside of the automobile".

Regarding Claim 9, Schofield (Figure 19) shows an infrared illuminating device (162) mounted on an automotive vehicle that illuminates an area outside the vehicle, an image pickup device (14) to pick up images outside the vehicle, and an image processor within the vehicle (Figure 14), which reads on "the infrared light irradiating means, the imaging means and the image processing units are provided in an automobile; the infrared light irradiating means radiates the infrared light outside the automobile and the imaging means images the outside of the automobile".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is (571) 272-9819. The examiner can normally be reached on M-F 7:30AM - 5:00PM EST, Alt. Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian T. Pendleton can be reached on (571) 272-7527. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MPD

BRIAN TYRONE PENDLETON
PRIMARY EXAMINER